



MISSOURI BOTANICAL GARDEN

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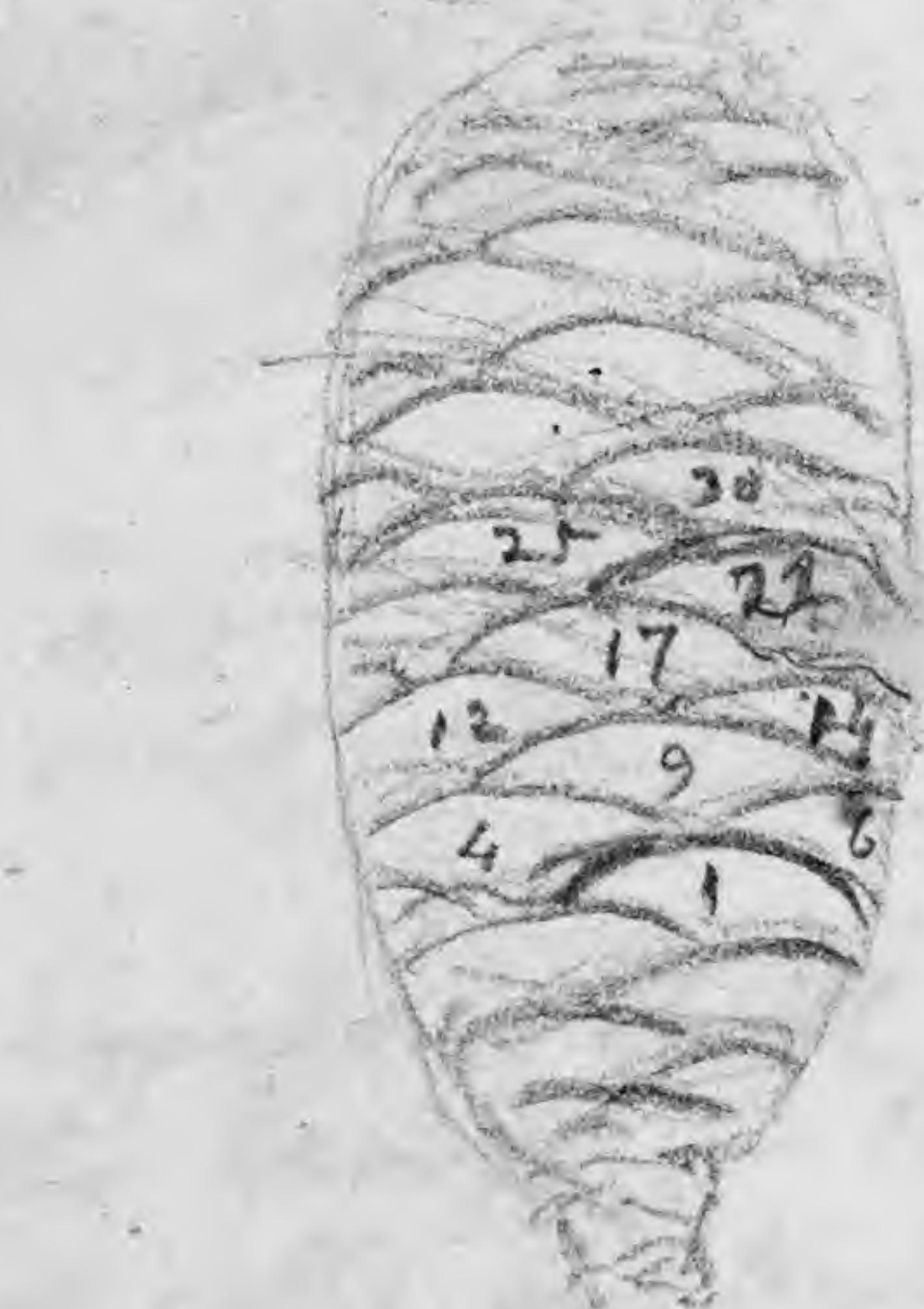
GEORGE ENGELMANN BOTANICAL NOTEBOOKS

Pagination Note:
Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

P. balsam

June 1st 1872

tree south of Green house, 1103 Missouri May 31 1872
SW



8/21 arranged



leaf on main axis



X10

leaf on stouter

lateral branch (offer more acute)

leaf on last branchlets

leaf on last branchlets

larger, obtuse

leaves only

fast branchlets
sterile

scot near tip

middle

above base



stomata on
both sides



0 1 2 3 4 5 6 7 8 9 10

cm

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12702

ML 1

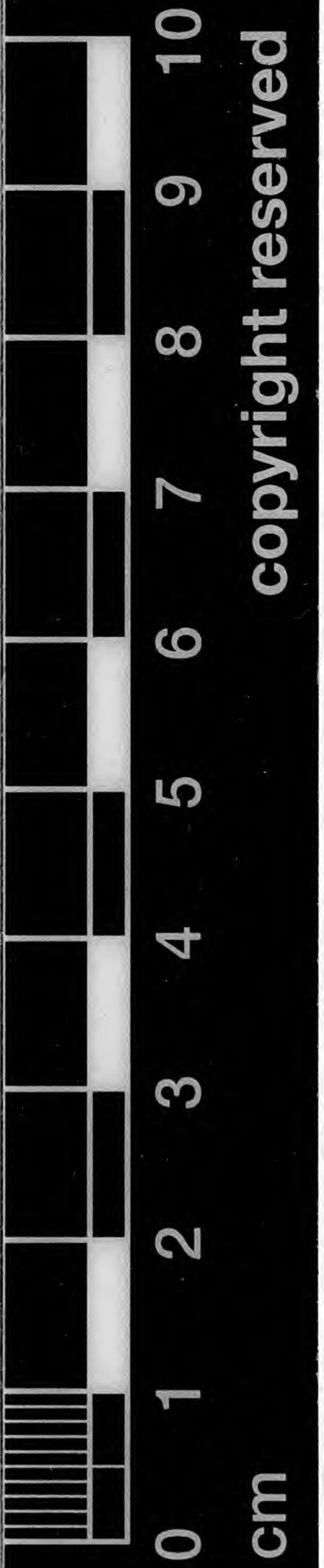


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Abixia balsamum

Oct 2nd 18

Herb. Coll. Museum 1872

central band of stoma

H.B. Morris
1865
is the same

no hypoderm at all in
flatter leaves, in thicker ones
a few cells at Keel, - others also a few on edges

6-8 lines of stom.
in each band

covered with stomata

H.B. Cambridge
2/6 1873
is the same

only leaves less
long pointed

about 6 lines of stom
in each band

no hypoderm above, well developed at edges
some at Keel.



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cm

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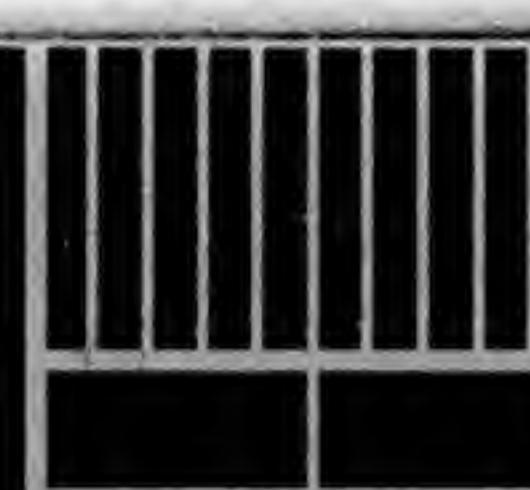
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MISSOURI BOTANICAL GARDEN HERBARIUM

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Druggist & Apothecary



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Abies Balsamea

19 July 1872

Abies Balsamea

Oct 2 1875

lower branches

MacLean, H. Gillman 1873

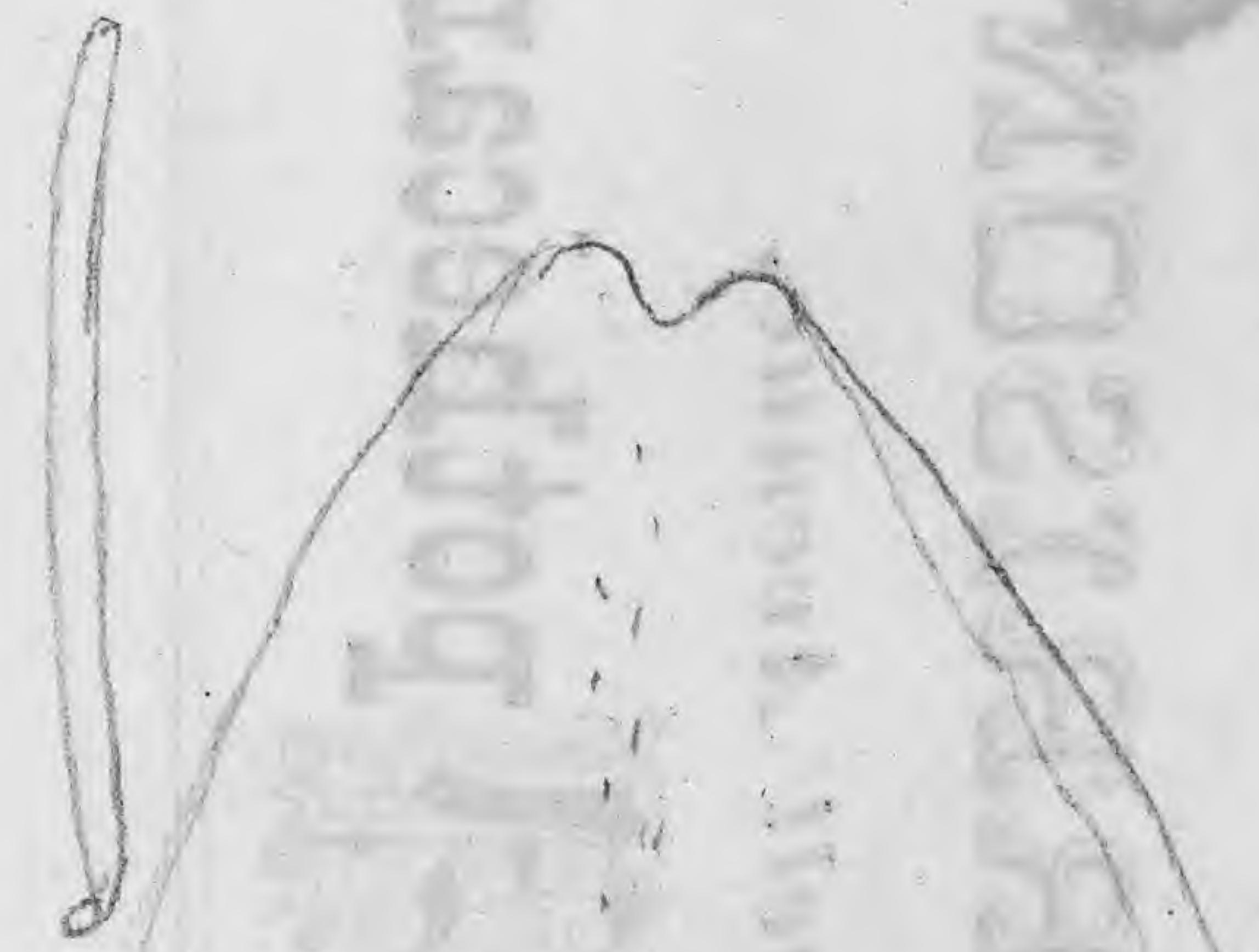
& H. Gillman 1/1 1872

line of few stoma in upper
part of groove

no hypoderm cells
at all!

about 7 lines of stoma
in band

Gillman 1872 has the ducts also toward the margin
and near the lower side of leaf, but separated
from the cortical layer by paranchyma, as in this



0 1 2 3 4 5 6 7 8 9 10

cm

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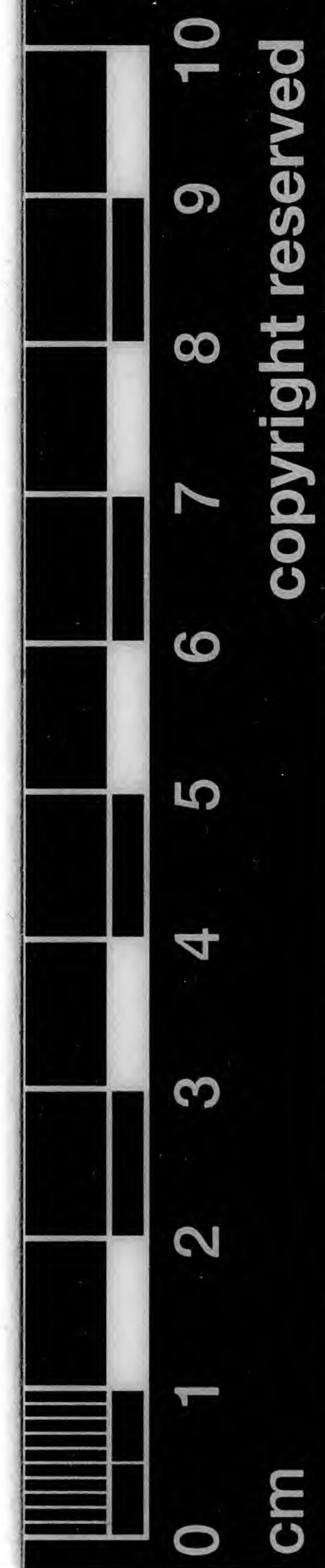
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Fruggist & 
Sect. 19

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Abies Balsamea

19 July 1872

Michigan, H. Gillman lower branches -



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cm

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A. balsamea
base of mount Washington
young tree?

Oct 1 1875

S. Lovell Sept 1856

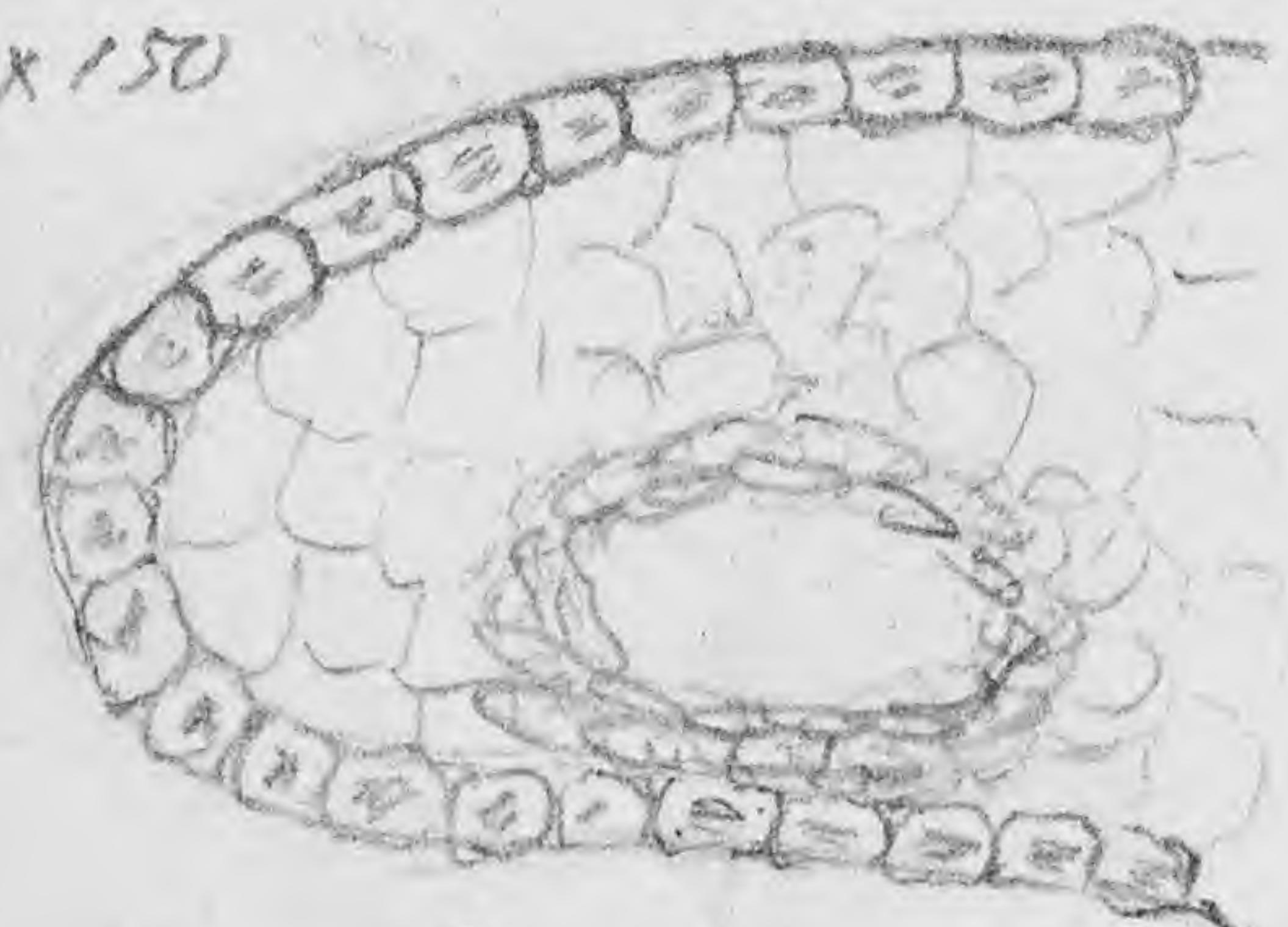
$\times 30$

no stomata

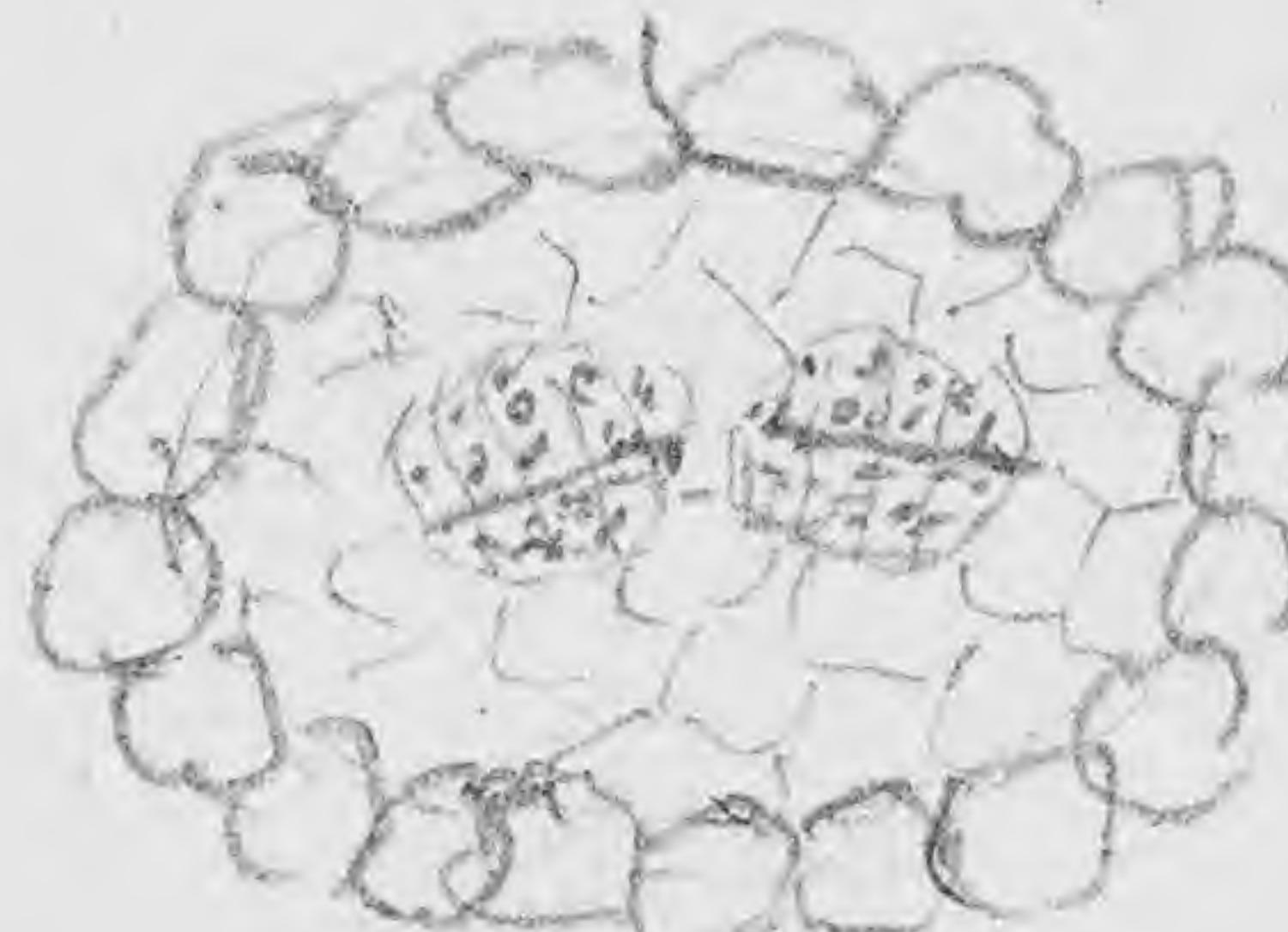
4-6 lines
of stomata in each band

2 bands of stomata

$\times 150$



Jan 25 1876



$\times 150$

no hypoderm at all



0 1 2 3 4 5 6 7 8 9 10

cm

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A. balsamea

Oct 1 1875

dwarfed, near top of Mount Washington

, G. Engelb. Sept 1856

x 30

crowded with stomata



two white bands
of stomata, cork with
7-8 lines.

no hypoderm above, a few cells only
on carina and on the leaf-edges.



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cm

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0
cm

1

3

2 4 5 6 7 8 9 10

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Abies balsamea

Oct 2nd 1875

Hooper, West Chester, 1872

Foulfam's branch

×30

surface covered with stomata



4-7 lines of stomata
in each band

flat leaves have no hypoderm at all
thick leaves, like the above, have none
on upper surface, but on keel and
edges it is strongly developed, all
around the sides, to under the ducts.



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cm

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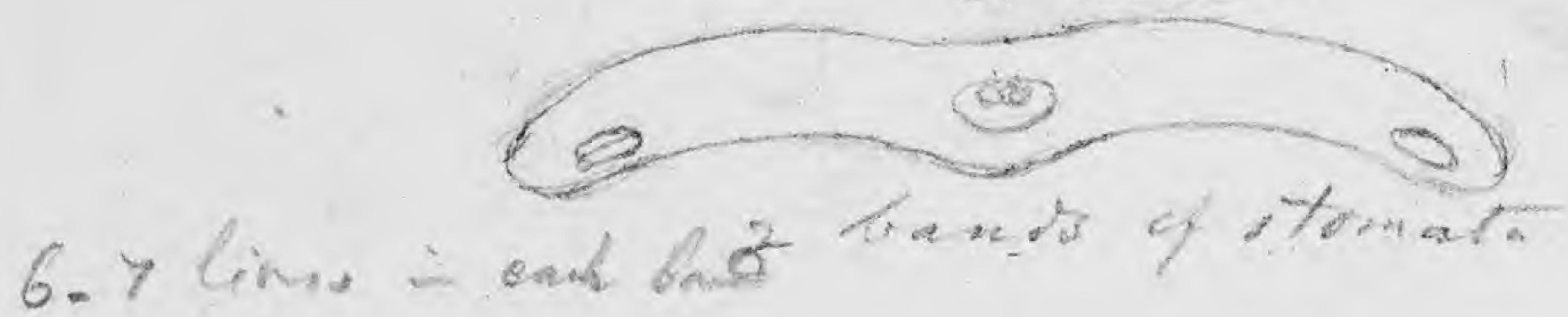
et Balsamea

MICHIGAN, H. Gillman 1873

OCTOBER 2 1875

$\times 30$

few stomata at tip
or none



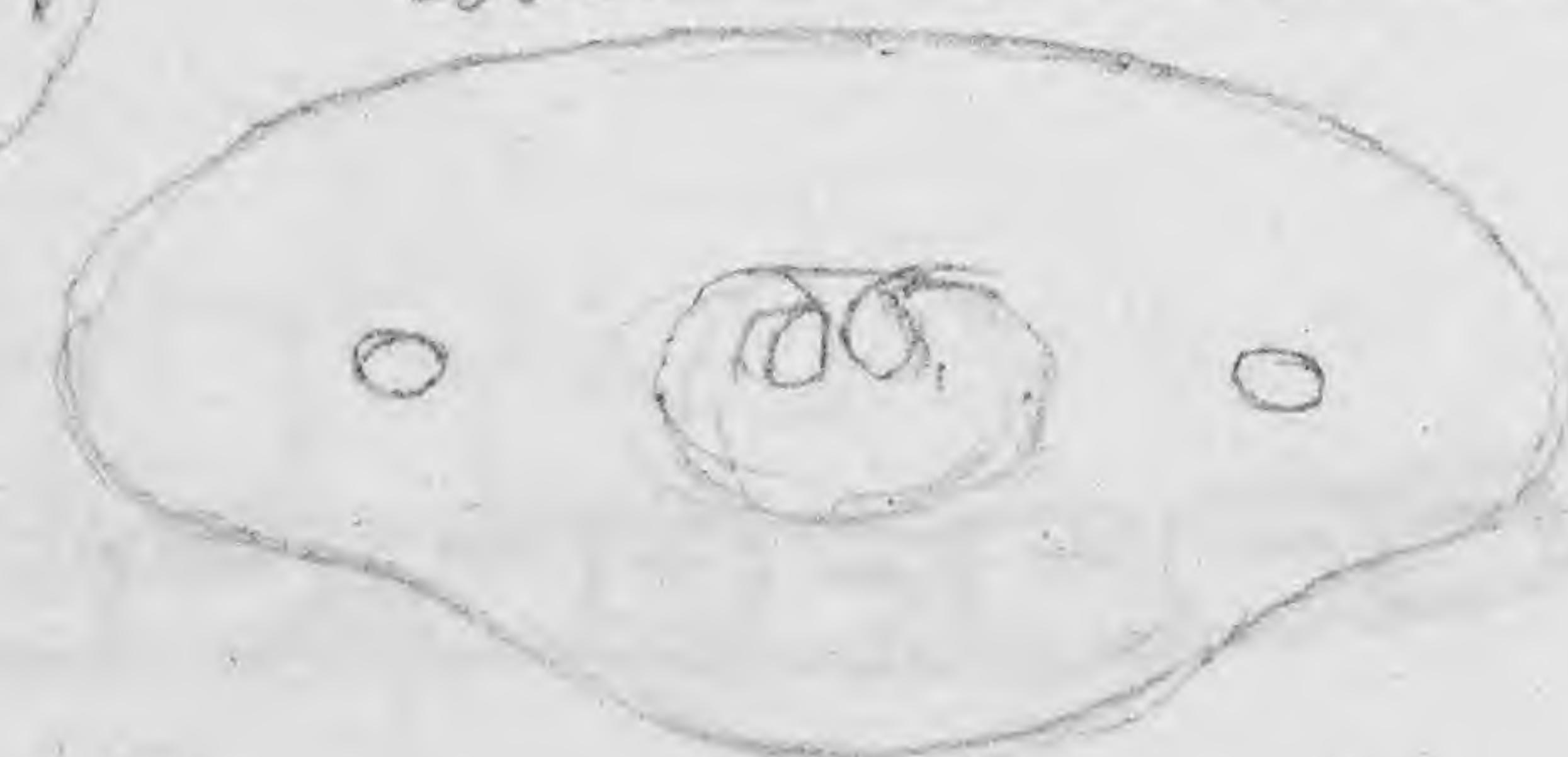
this year's
leaf
young shoot

covered with stomata

Windsor, VT
in H. Gray
is very much
like these

covered with stomata

only 2-4 lines in
each band



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cm

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H. Gillman

12709

× 150

Scientific Illustrations
Samuel Willard
and
Mark Catesby

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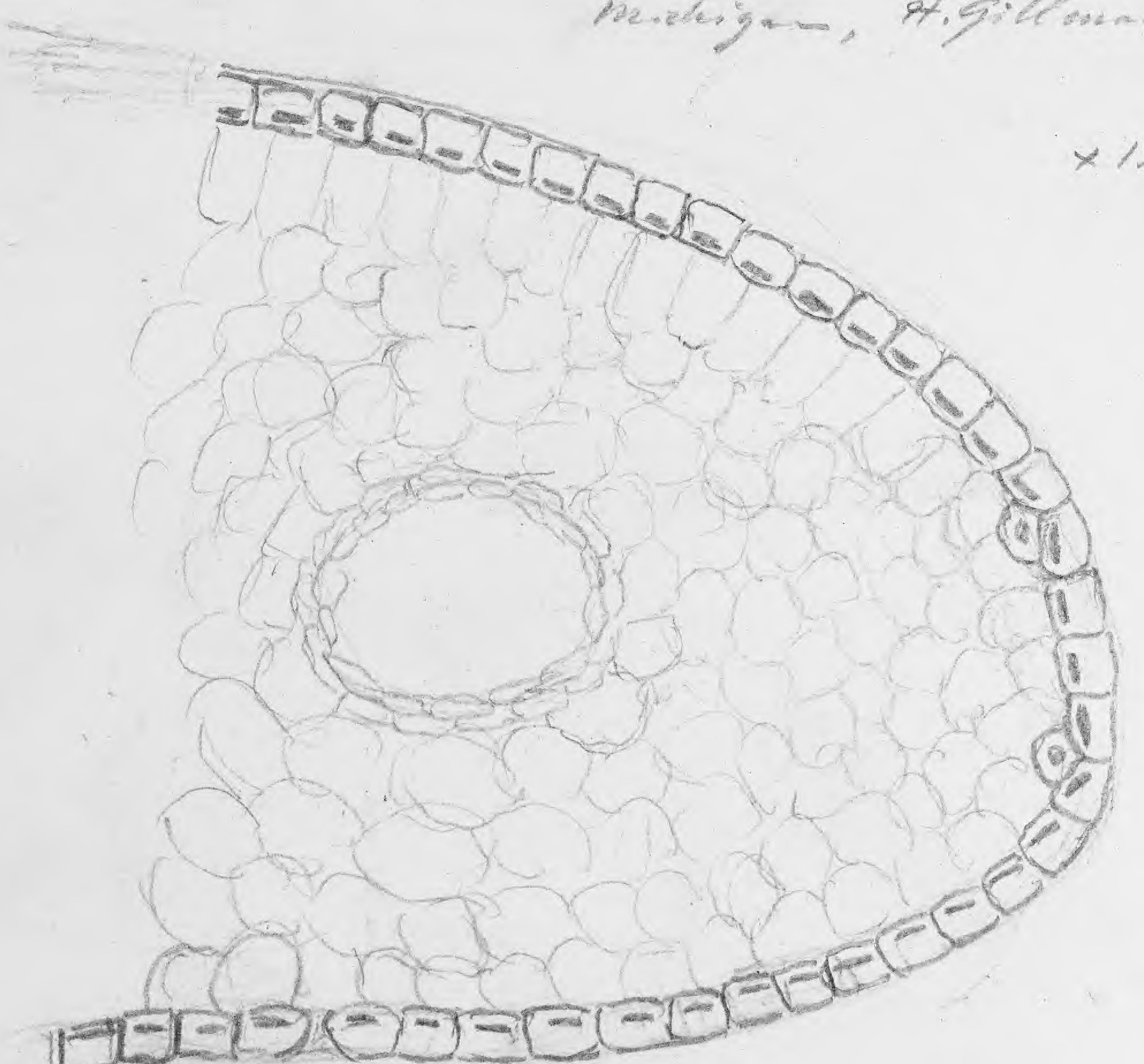


0 1 2 3 4 5 6 7 8 9 10
cm

A. Balsamea

Jan 25 1876

Michigan, H. Gillman 1873



x 150



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Abies Balsamea

Manitou Island, Lake Michigan

stomata few, toward tip

Oct 1 1875

J. Engelm Aug 1860



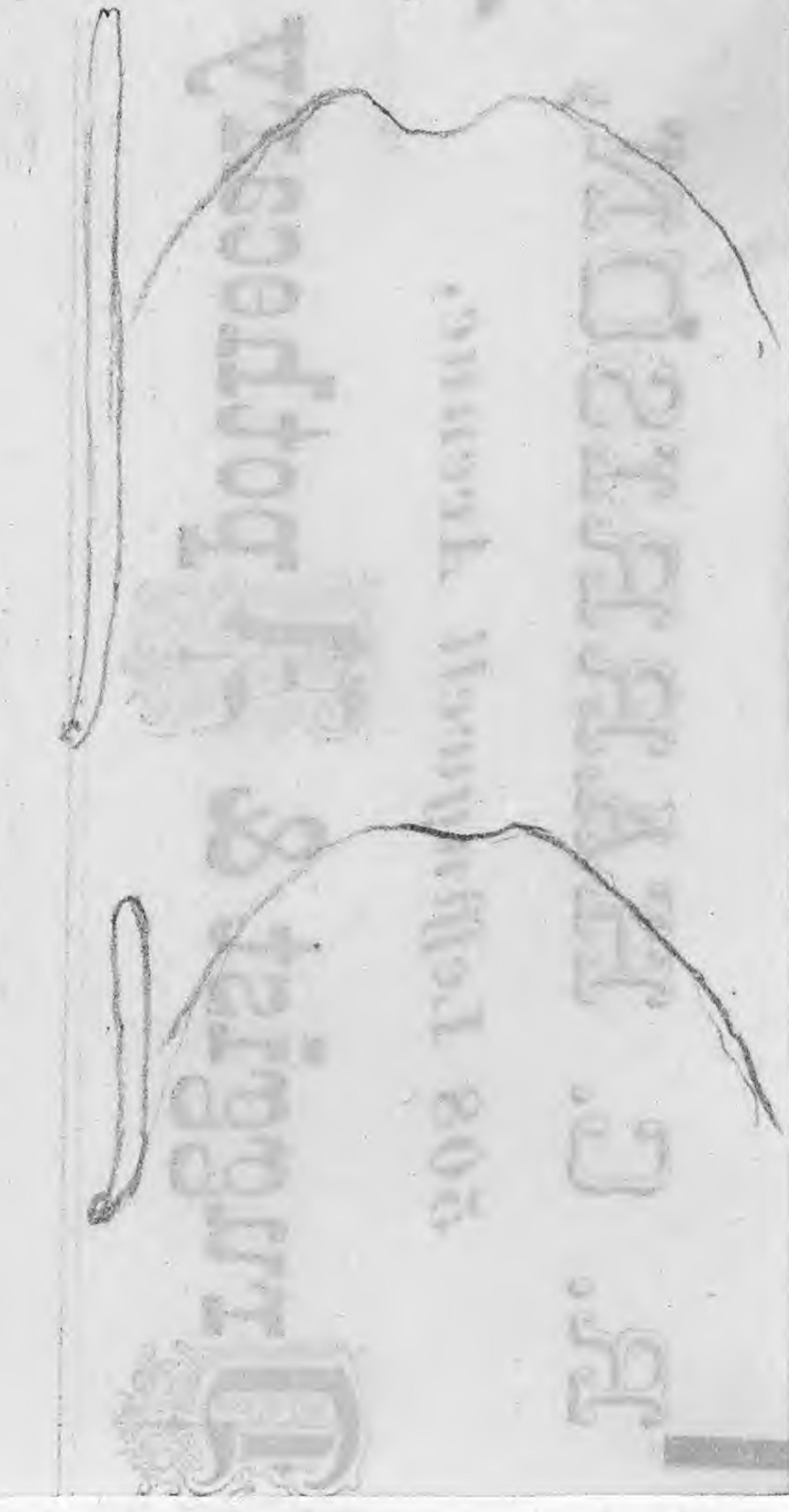
x 30

2 bands of stomata
each of 6 lines

... middle band of stomata
narrow



2 bands of stomata
scarcely a few hypoderm cells at carina,
none above nor even on edges of leaf



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cm

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"*Abies Fraxinii*"

Oct 2 1875

Herb. Bot. Berlin 1869

$\times 30$

very few stomata



$\times 150$

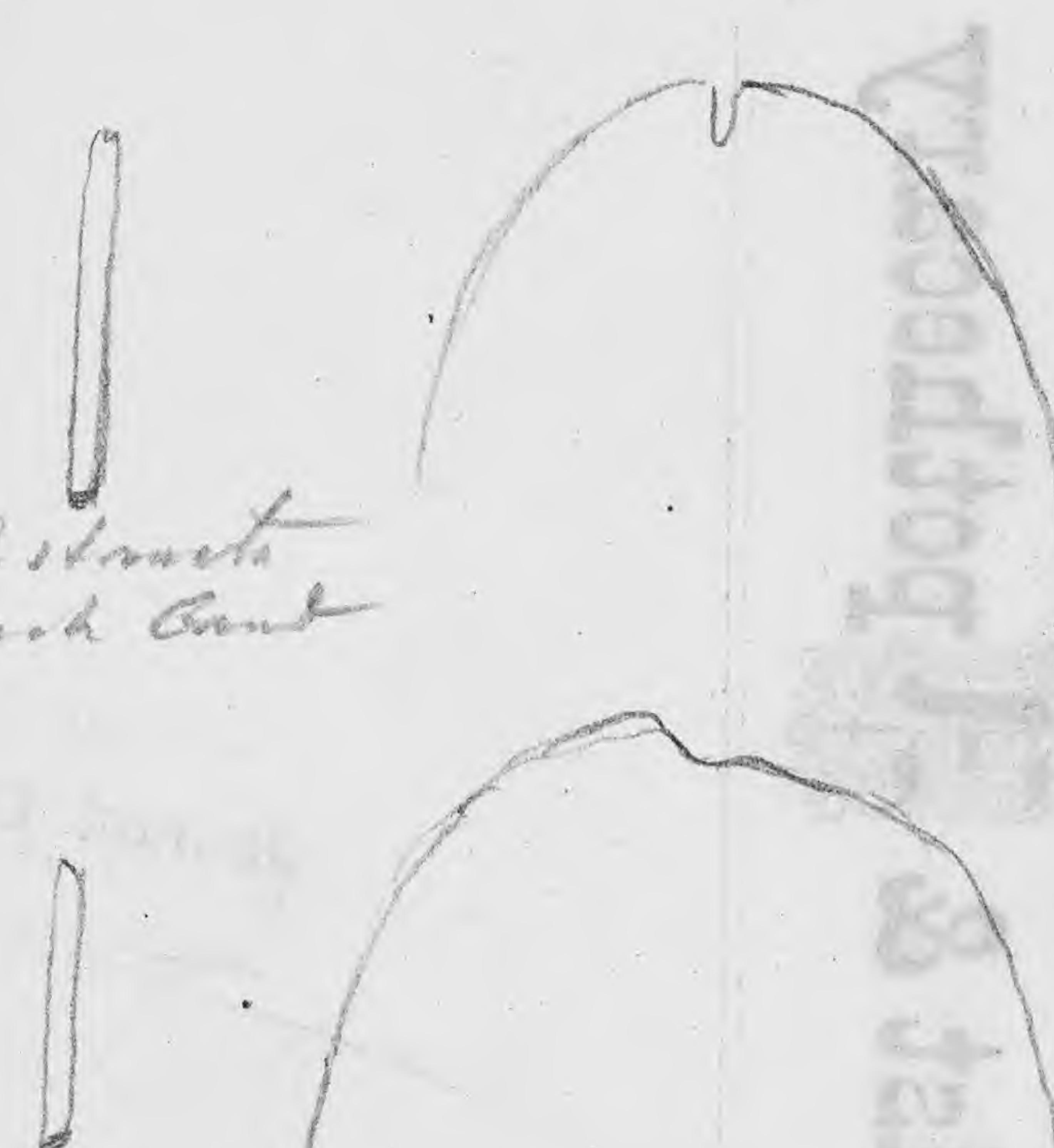


row of few stomata



4-6 lines of stomata
in each band

Ducts not close
to cortical stomata!
some parenchyma cells separate them



very few false test cells
on edges, and lower corona
none as hypodermis layer



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cm

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Abies

Abies subalpina
var. *folleyi*

Lager



0
cm

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Abies concolor D. R. &
Utah A. L. Pilat mis

June 12 1876

$\times 30$

10-12 series of stomata above



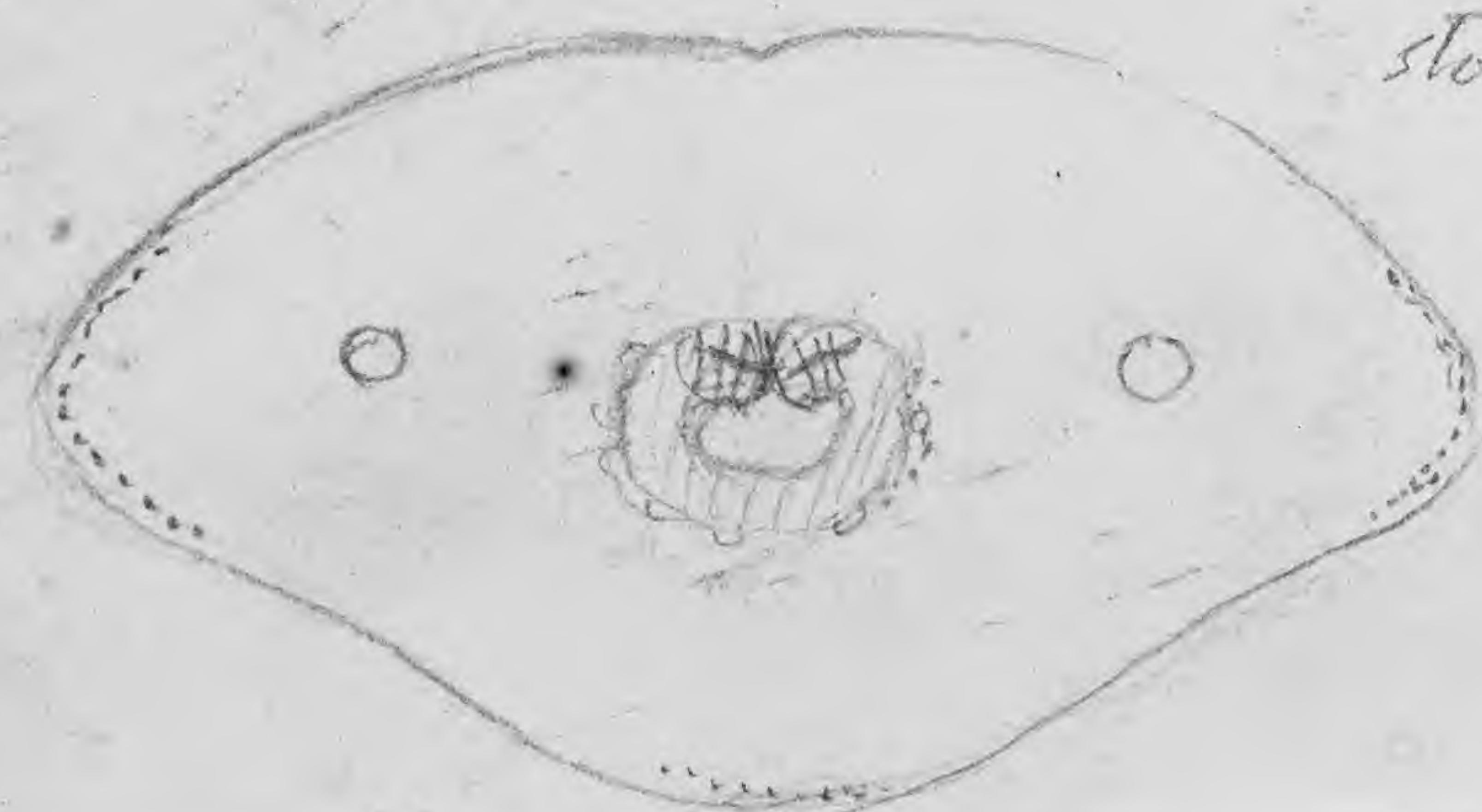
no hypoderm on
upper side - and very
little on Keel below; more
on both edges



$\times 150$



duct $\times 150$



stomata on both
sides
10-12 series
in all



Keel

hypoderm cells
small. not much
over half diameter
of epiderm cells



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cm

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Leitch & Corlies

GEORGE ENGELMANN'S

South West Corner. Fifth and Market Streets.

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cm

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Abies concolor Desv. Jan 12 1876
Wash. State
Pollen

x4



Flowers not open yet
triangular tip of Anthers
dark purple



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cm

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Leitch & Corlies

DRUGGISTS

South West Corner Fifth and Market Streets.

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"*A. amabilis*"

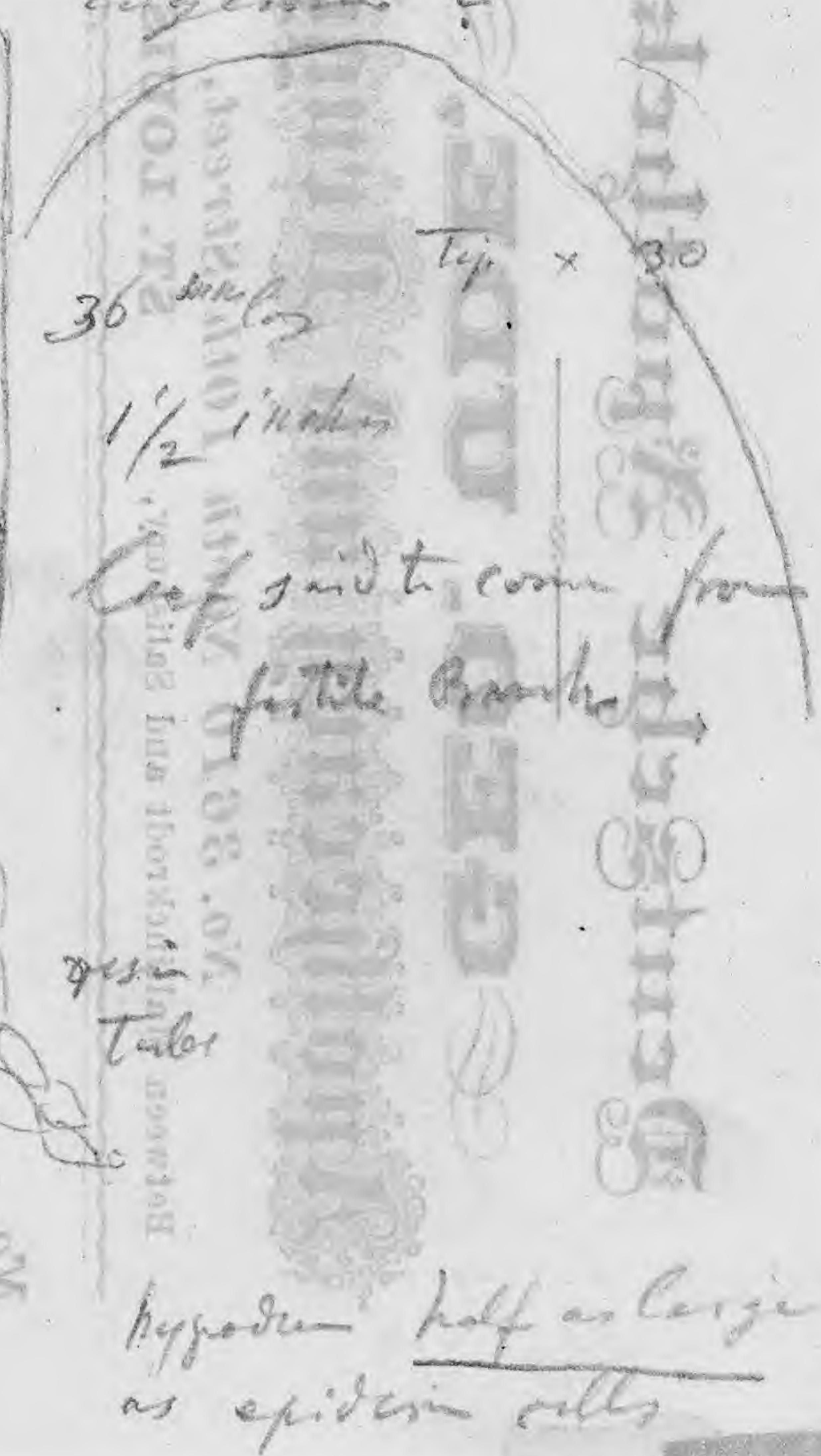
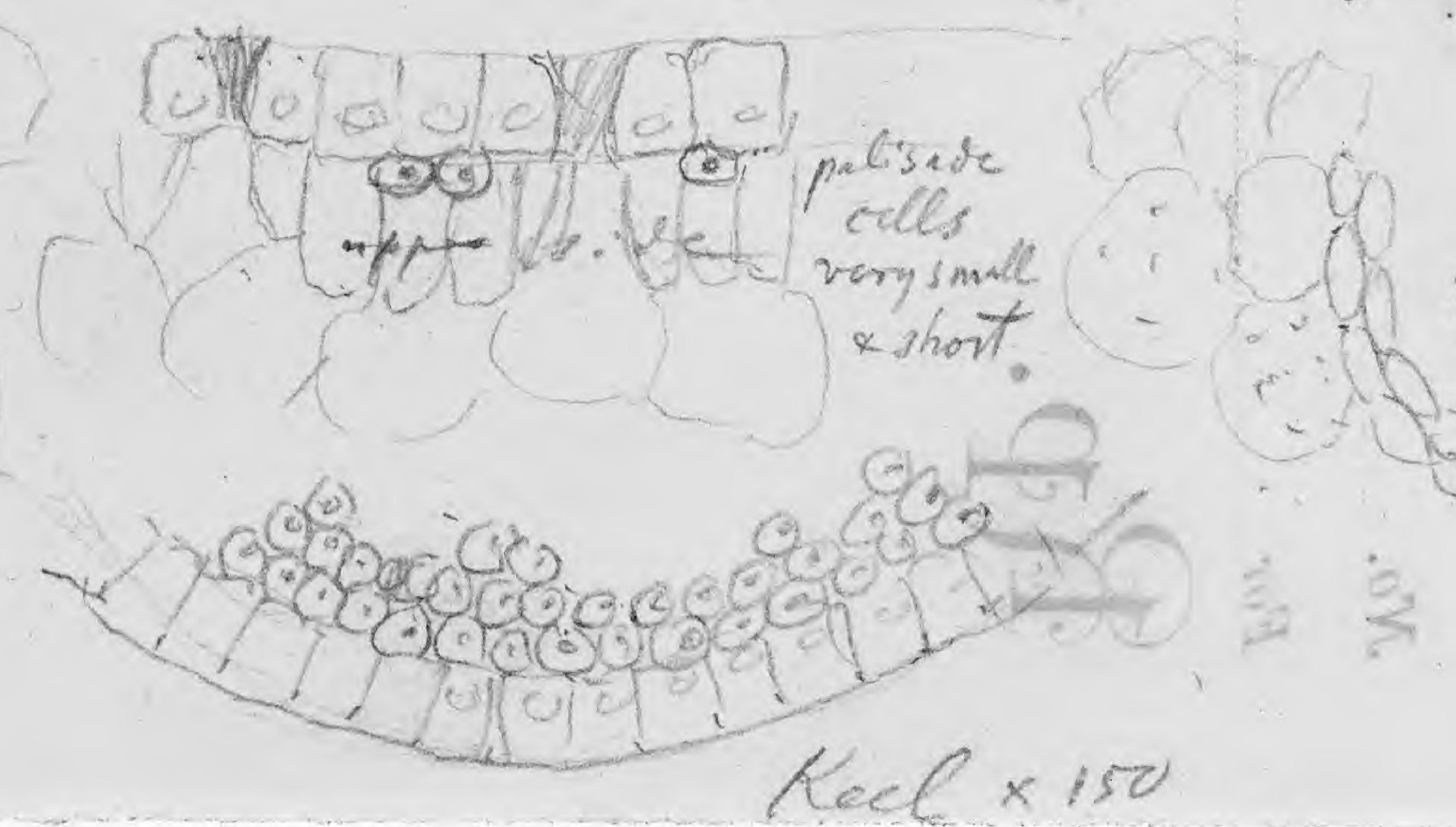
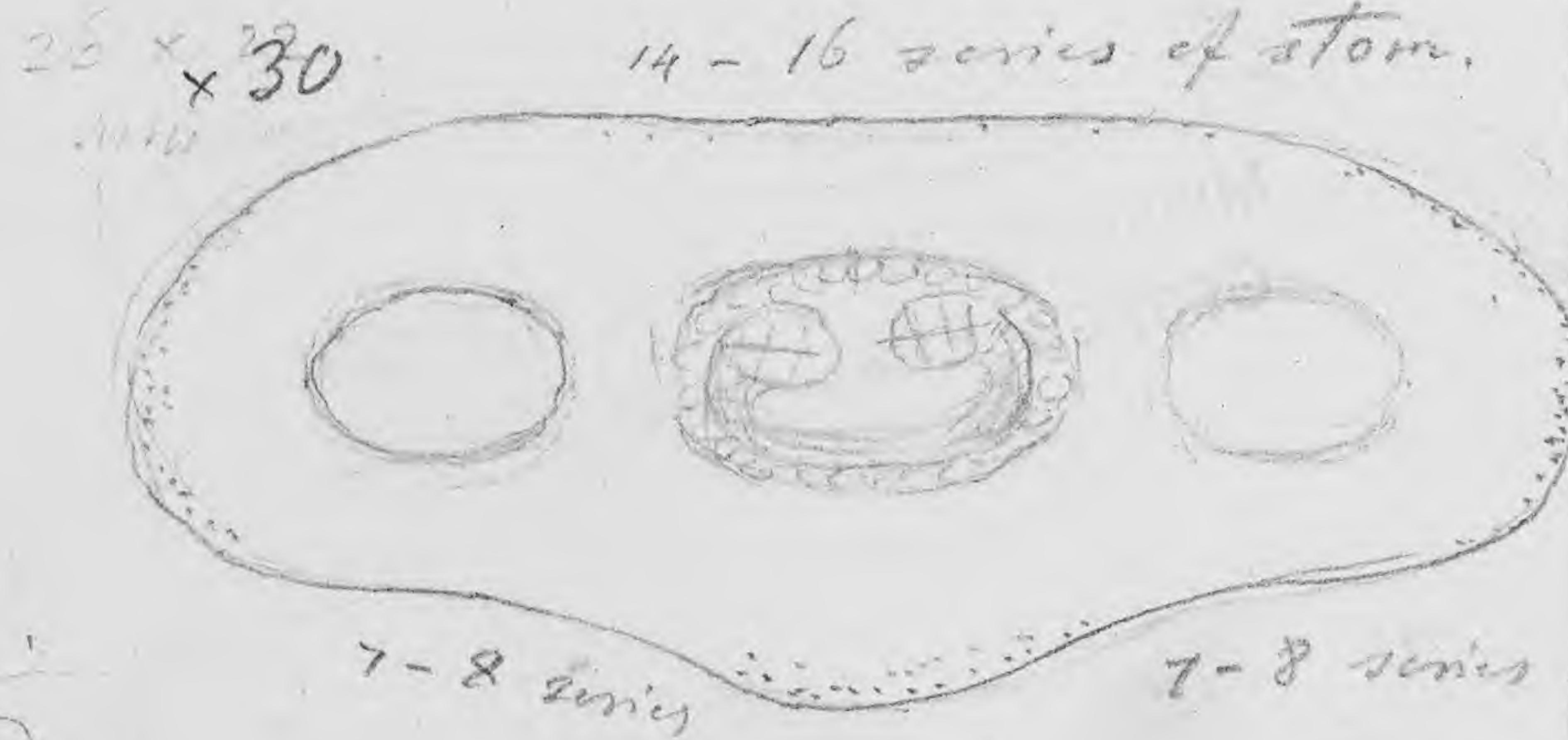
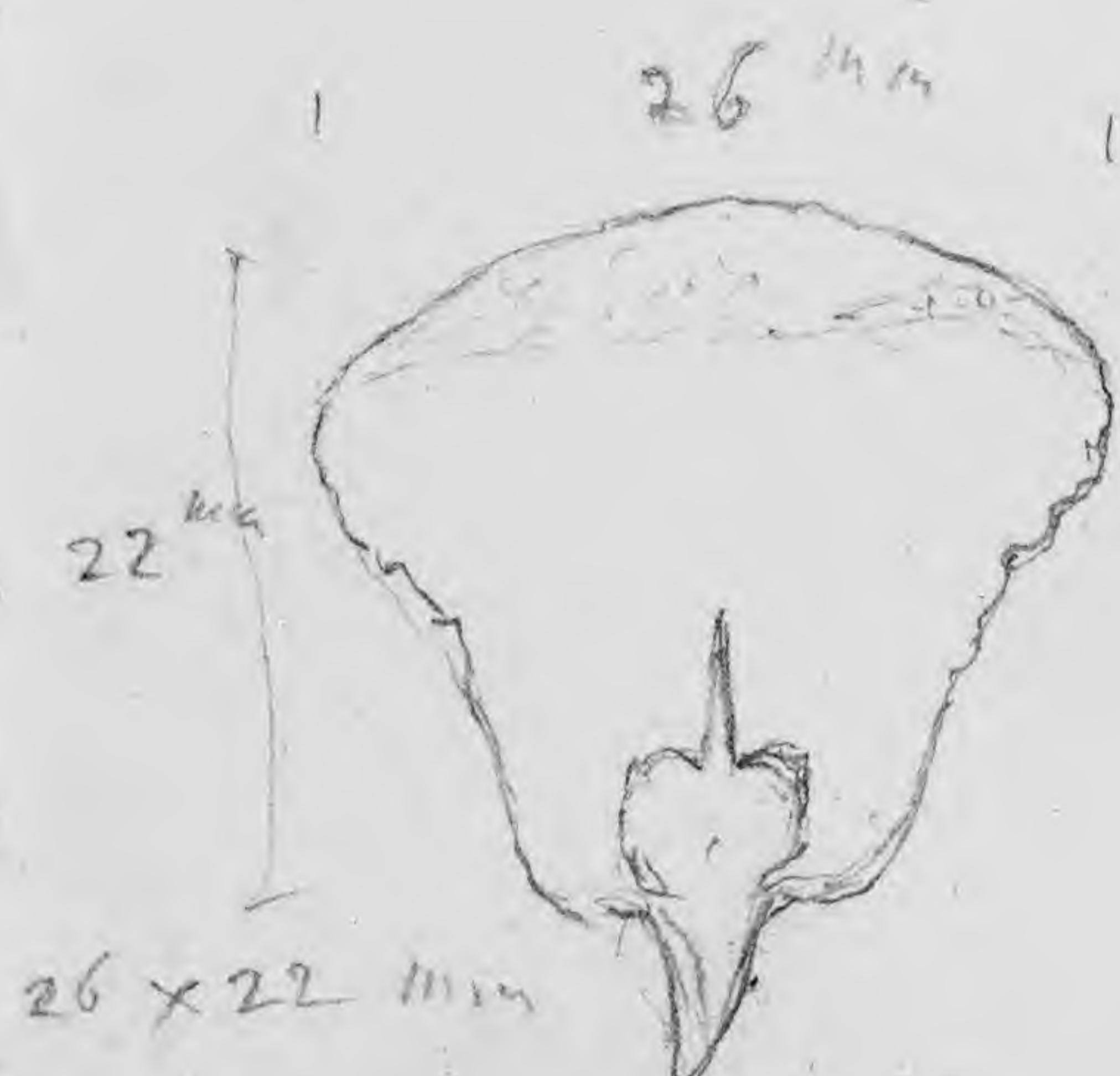
Oct 20 x 21

1877

Wadsworth 1855 Sept. Carson City

ex Hb. Agassiz Dep.

Do cones and leaves belong together?



0 1 2 3 4 5 6 7 8 9 10
cm

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Deutsche Agypte.

GEORG DÖTE.



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No.

For

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R.P.

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cm

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crown with stoma

hypodermally
on edges & few
now

no stomata

o. (no)

Oct 26 1875



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cm

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uata
wilson

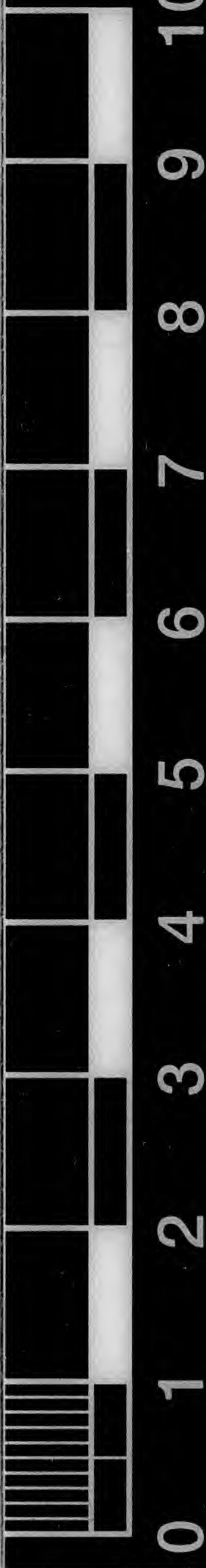
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cm

crown with stonew

wilson

stomata

x36

hypodermally
on edges & base

over

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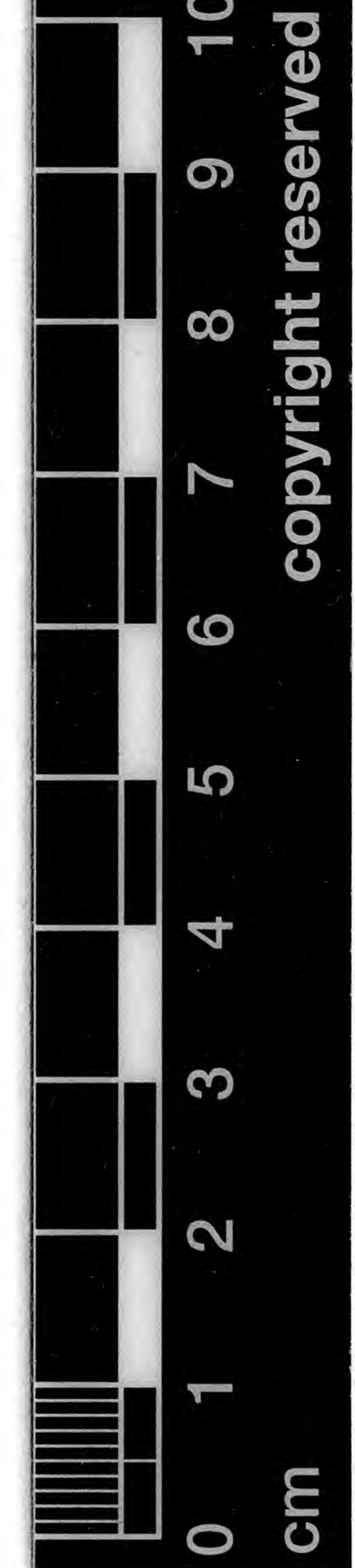
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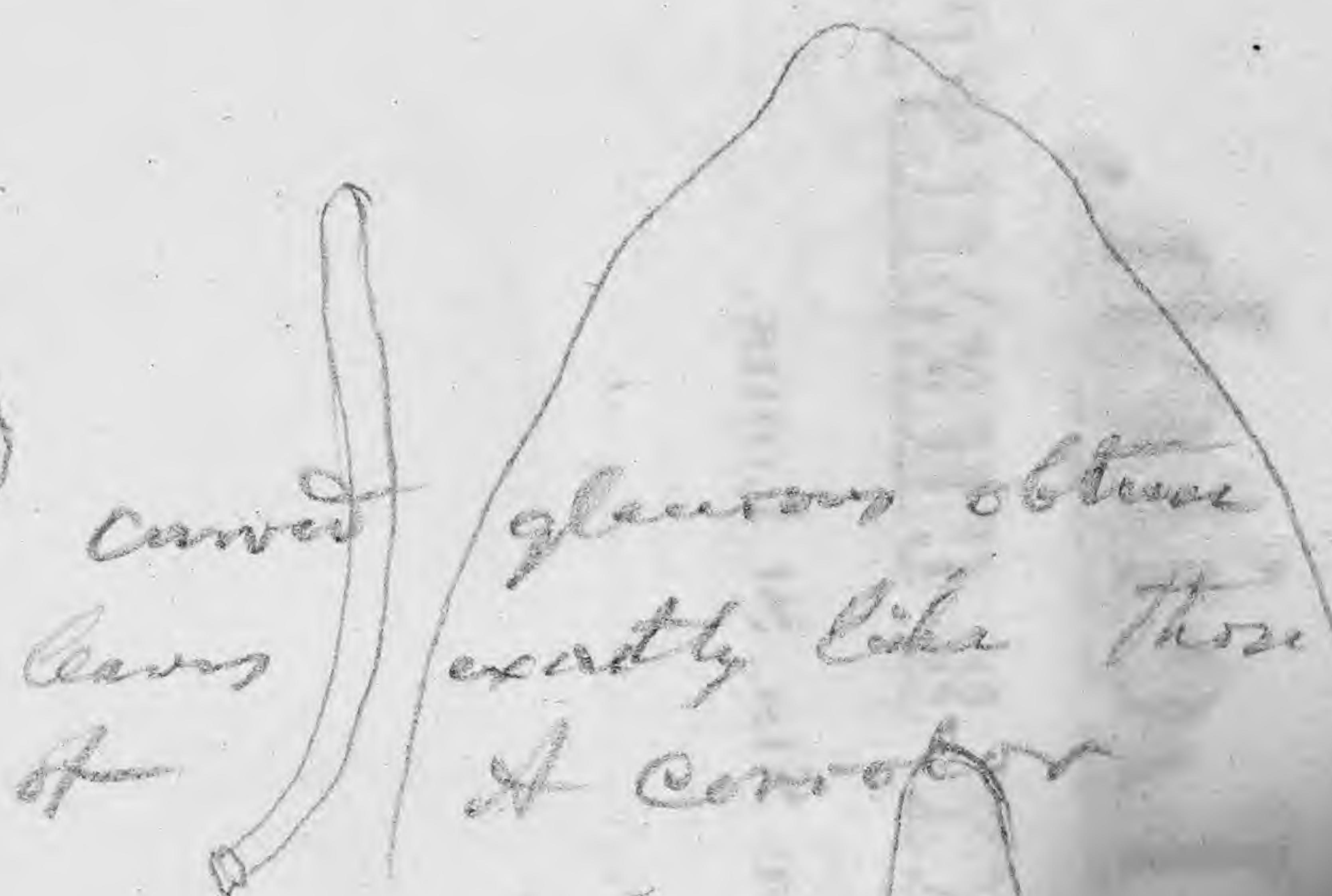


Abies "amabilis"

Oct 13 1895

Wasatch Mts.

Utah



hypodermally small
on edge & back, quite narrow
from above

MIS
6



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cm

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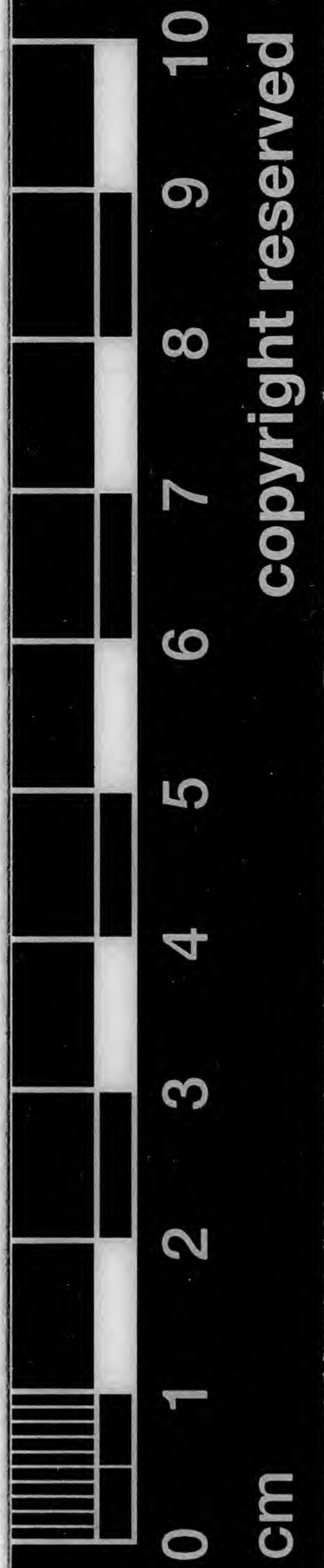
Cor. 4th & Olive Sts., St. Louis.

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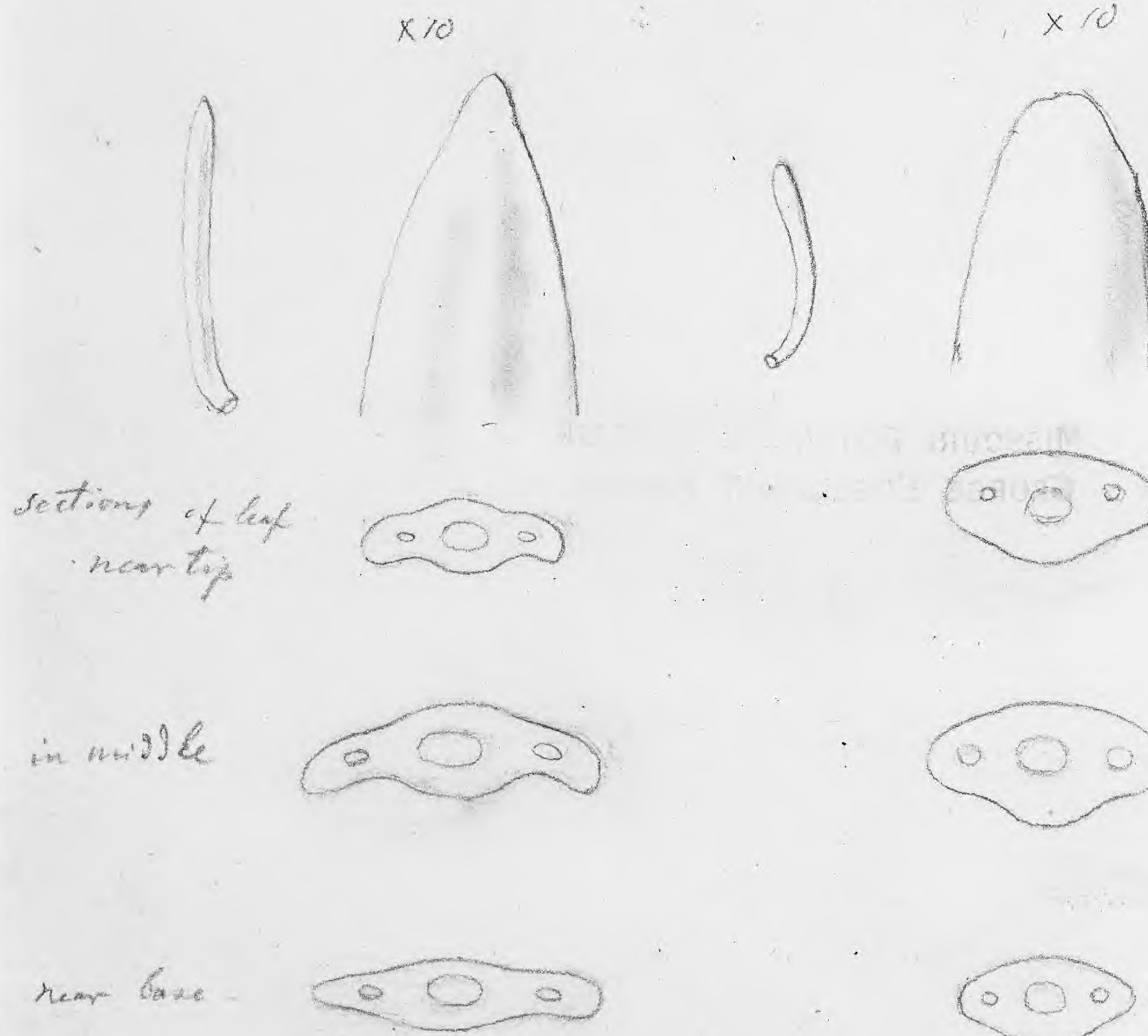
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"*A. amabilis*" Ampullaria!
S. Watson Catal p 233

April 9, 1872
Orch. 1872
from W. A. L. S. 1872
No. 269



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cm

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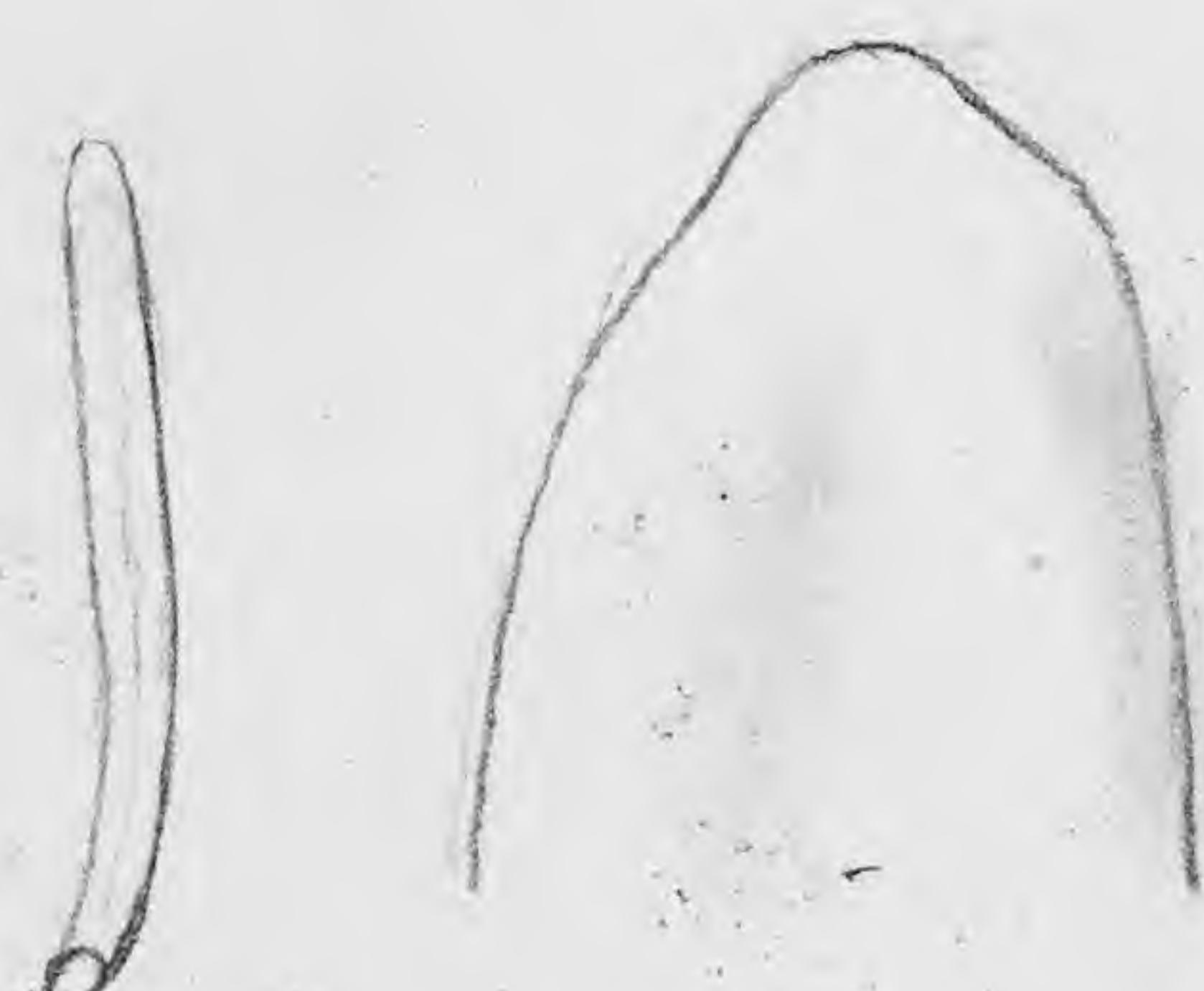
Abies grandis

April 15 1872

Freemont 1845 No 211

stomata abundant on both sides
of leaf

$\times 10$



scd. of leaf
near top



$\times 30$

Oct 6 1875

in middle



near base



hypodermis in 202

ability, Watson
has similar large
stomata April 1872



0 1 2 3 4 5 6 7 8 9 10

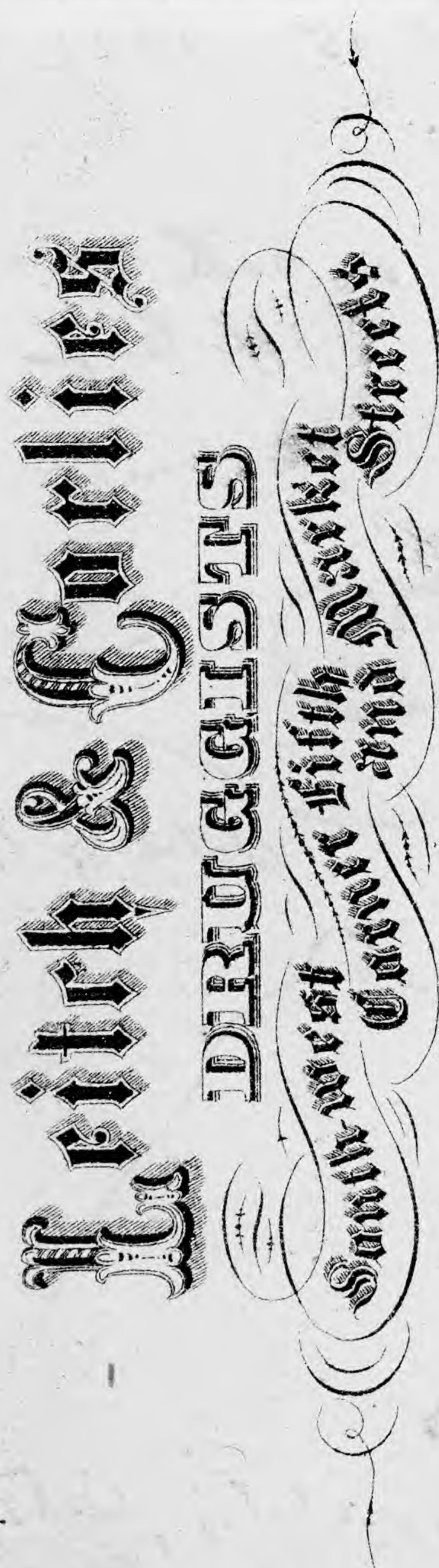
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Alres grandis

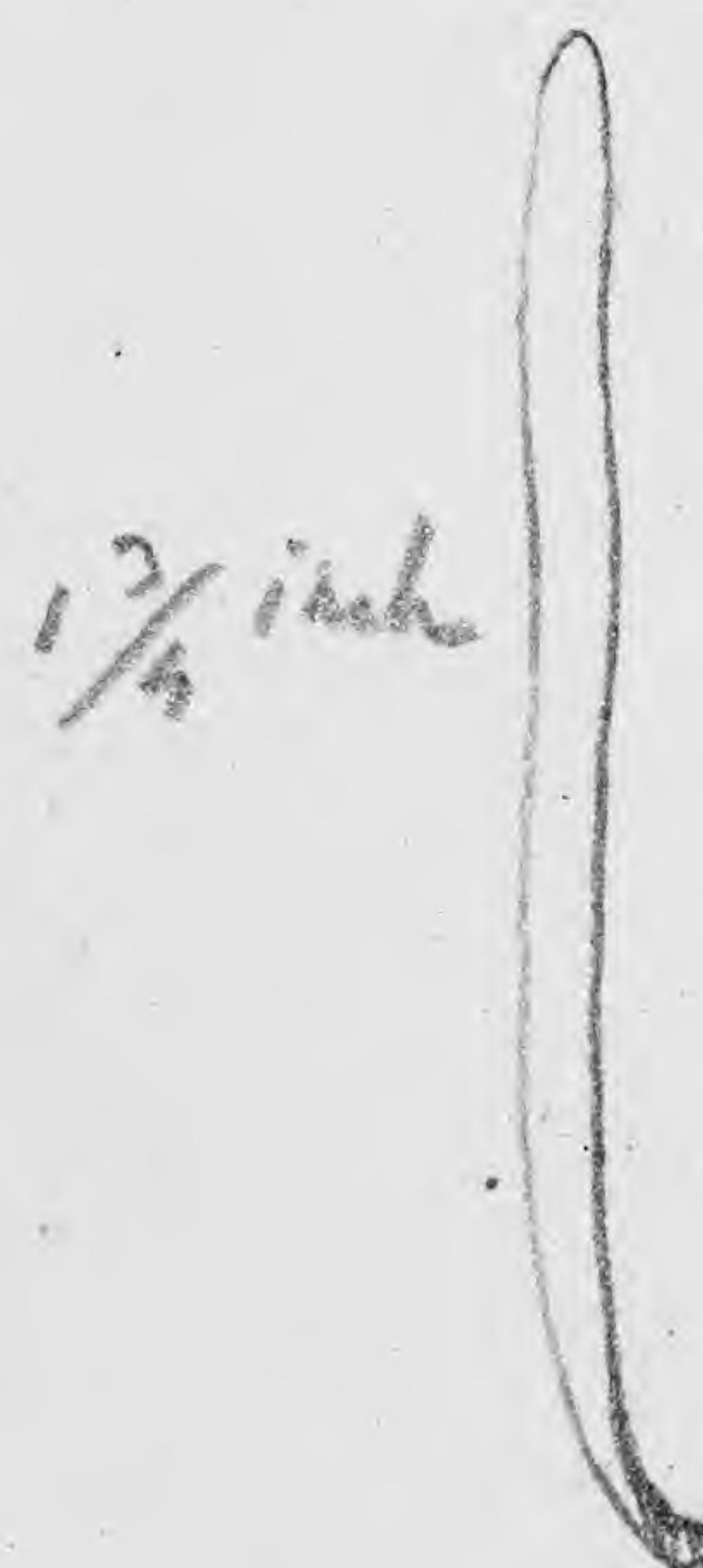
Louisiana

April, 15, 1872

Formentor 1845 No. 202

stomata abundant on both sides

stomata abundant



$\times 10$



$\times 10$



$\times 30$

40th
1875

hypoderm cells
on edges & a keel
small but many
none above



soft of leaf near tip

in middle

near base



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cm

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cm

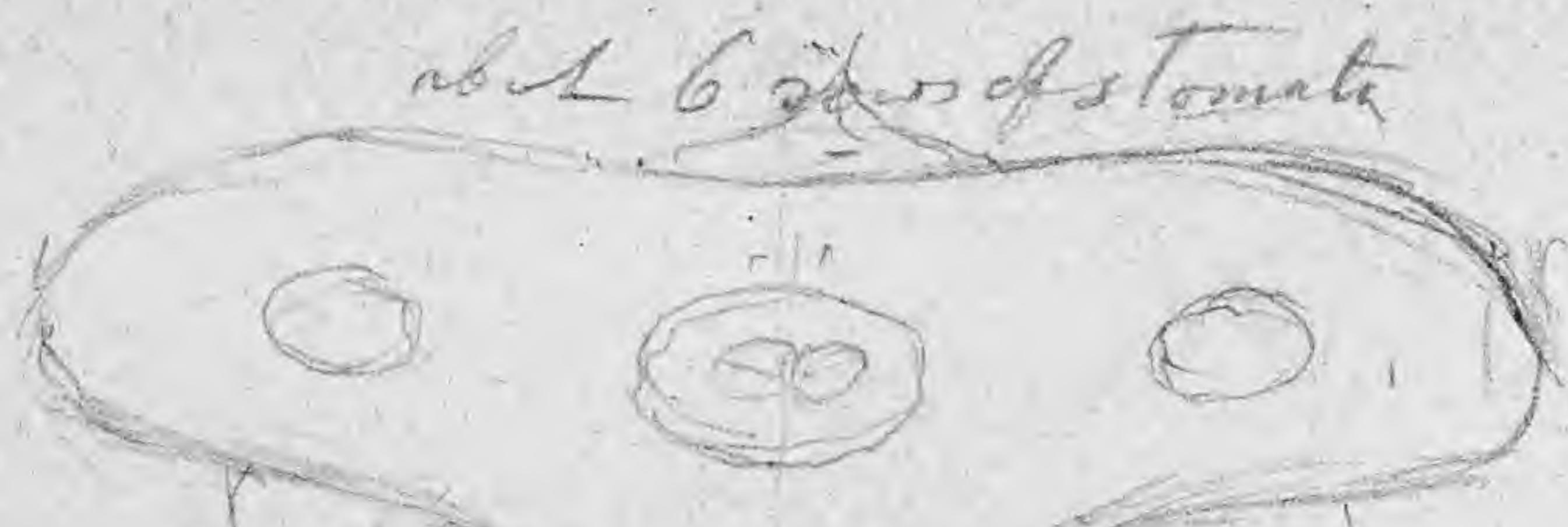
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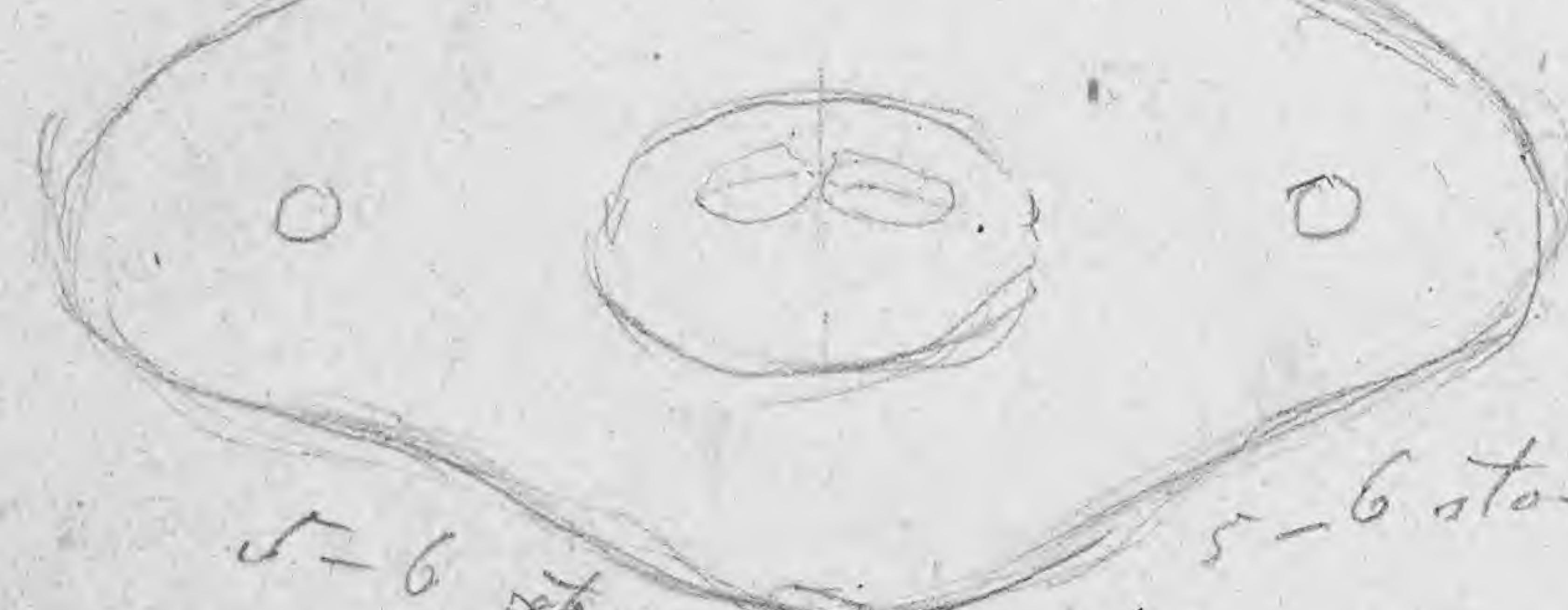
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Abies lasiocarpa
stommatosa

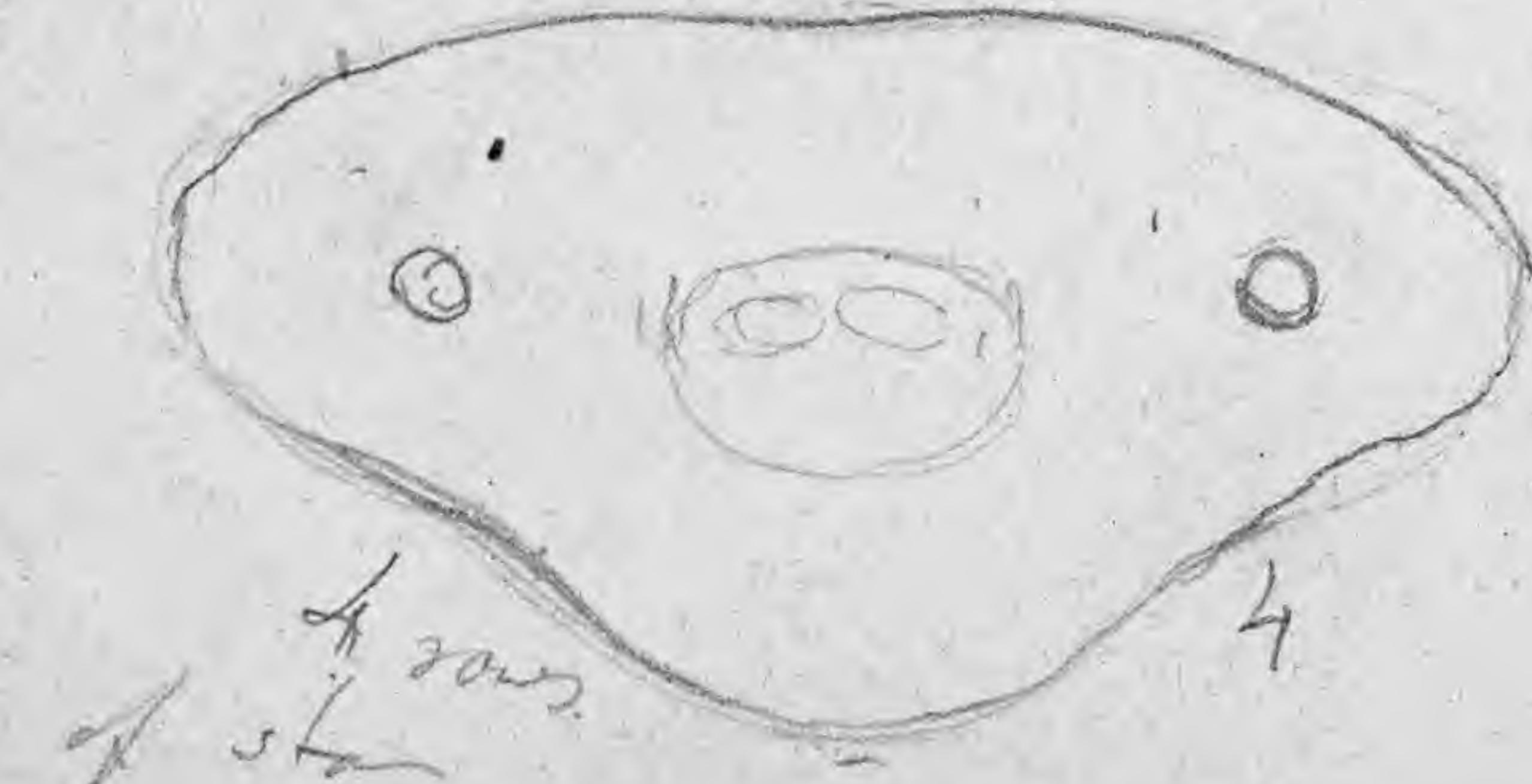
July 19 1877



6 rows
of stomata



8 rows of sto



long
1/2 inch

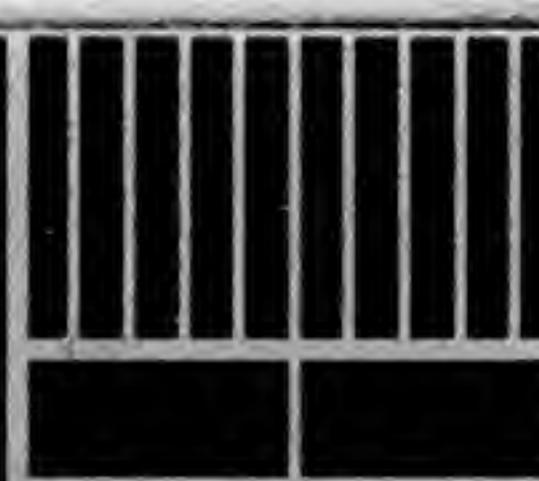
leaves on an
axis which a

bare cones

stout leaves on vigorous shoot
which bears cones



purple bud & scale after
flowering X4



0 1 2 3 4 5 6 7 8 9 10

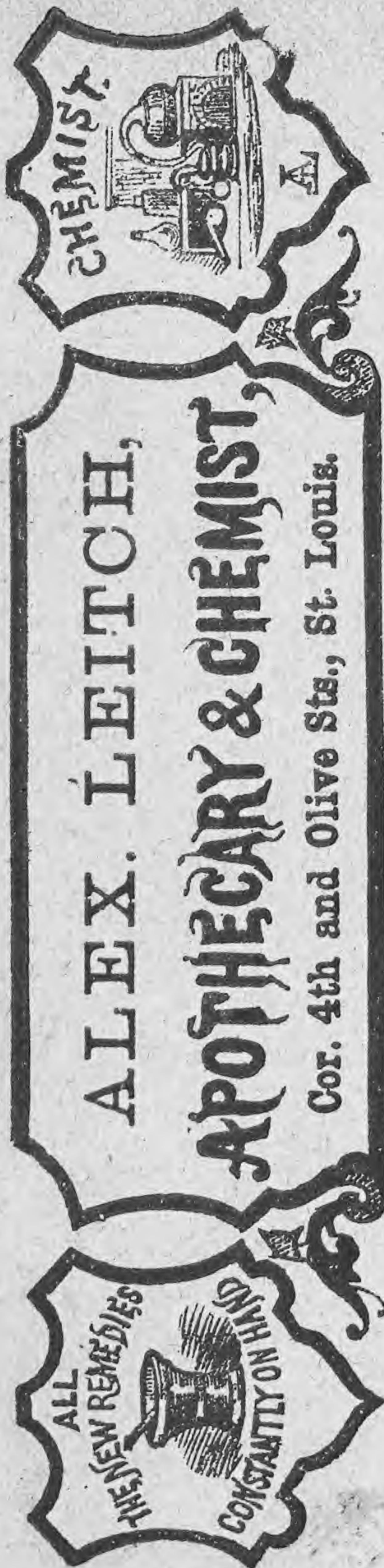
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